

The Problem:**Given any three non-collinear points, find the equation of the circle that contains them.****Geometry Solution:****The perpendicular bisectors of two chords of a circle, intersect at the center of the circle.****I. Problem Set-up:**

1. You need to select three non-collinear points to use in your solution. Your first point will be in Quadrant I, so choose a point with x and y coordinates between 5 and 25; for example (13 , 20).

First point: (_____ , _____)

2. Let your second point be in Quadrant II, again with values between 5 and 25, or -5 and -25, but select different values than you did for the first point.

Second point: (_____ , _____)

3. Your third point can be in Quadrant III or Quadrant IV. Use the same range of values as above, but again make sure the values are different from your first two points.

Third Point: (_____ , _____)

4. Create a **scatterplot** of the three points you have selected on your graphing calculator. Set up your window so all three points can be seen.

II. Algebra Solution:

The actual algebra steps for solving this problem will be discussed in class. Show all of your work neatly on another sheet of paper, but write the indicated steps of your solution below.

1. Equations of the two perpendicular bisectors.

y = _____ y = _____

2. Center of the circle (rounded to 0.001).

(_____ , _____)

3. Radius of the circle (rounded to 0.001).

r = _____

Before writing the equation of the circle, you can check to see if the center and radius that you calculated are correct. From the Home Screen (not the Graph Screen) select **2nd**, then **PRGM**, for **DRAW**. Scroll down and point at **9:CIRCLE**, then press **ENTER**. This will bring the Circle command to your Home Screen. Type in the value for the Center that you found, followed by a comma, followed by the Radius that you found, followed by the closing parenthesis, and hit **ENTER**. The circle with the indicated Center and Radius will be graphed.

If the circle goes through the three data points of the scatterplot, continue with the worksheet. If not, find your mistake! (Again, you may need to adjust your window to see all of the circle. Also, if the figure does not look "circular", try a **5:ZSquare** from the **Zoom** menu of your calculator).

Before proceeding, clear the Circle from your graph by selecting **2nd**, then **PRGM**, then **1:ClrDraw** (and **ENTER**).

4. Write the equation of the circle with the correct center and radius.

Equation: _____

III. Checking Your Solution:

1. Solve the equation of your circle for **y** and enter the two resulting equations into **Y1** and **Y2** of your graphing calculator.
2. Graph the equations and, if you have solved the Great Goody correctly, again you should see a circle going through the three points of your scatterplot!
3. If the circle does **not** go through your three points, find your algebra mistake and try it again!
4. Show your final graph to me to verify that the problem was solved correctly when you turn in your algebraic solution. (I will initial this sheet .) Attach this worksheet to the paper that contains all of your work.